CLAIMS

WHAT IS CLAIMED IS:

1. A method for performing route calculations in a link state routing protocol at a node within a computer network, the method comprising:

receiving new route information at the node;

evaluating existing routes of the node; and

recalculating routes for the node only when said new route information improves at least one of the existing routes or at least one of the existing routes is made worse or lost.

2. The method of claim 1 further comprising receiving a link state packet with information about the node's path to a root node and wherein the node's route to the root node is improved and further comprising evaluating the node's neighbor nodes.

3. The method of claim 1 further comprising receiving a link state packet with information about the node's path to a root node and wherein the node's route to the root node has worsened and further comprising evaluating the node's path to the root node.

4. The method of claim 3 wherein nodes contained within a subtree containing the node are scrapped and the routes to all nodes in the subtree are re-evaluated.

5. The method of claim 1 wherein recalculating existing routes comprises implementing equal-cost path splitting.

6. The method of claim 5 wherein the new route information improves existing routes and only a parent node sending the new route information is used in recalculating routes.

7. The method of claim 5 wherein the new route information worsens existing routes and a parent node sending the information is no longer considered a parent node by said node.

8. The method of claim 1 wherein the computer network comprises greater than one hundred nodes.

9. The method of claim 1 wherein said node has lost its path to another node within the computer network.

10. The method of claim 9 further comprising reattaching the node at a location within a remaining portion of a spanning tree.

11. The method of claim 11 further comprising recalculating routes to all other nodes in a subtree of which the node is a root node.

12. The method of claim 1 further comprising performing an incremental route recalculation for all nodes within the network that have received new link state information.

13. A method for updating a tree structure of a root node in a computer network of interconnected nodes after a change in the network's topology, comprising:

receiving new route information at the root node; and

applying an incremental Dijkstra's algorithm to the root node only if said new route information improves or worsens at least one of the existing routes or at least one of the existing routes is lost.

14. The method of claim 13 further comprising applying equal-cost path splitting.

15. A computer program product for performing route calculations in a link state routing protocol at a node within a computer network, comprising:

code that evaluates existing routes of the node when new route information is received;

code that recalculates routes for said node only when said new route information improves at least one of the existing routes or at least one of the existing routes is made worse or lost; and

a computer-readable storage medium for storing the codes.

16. The computer program product of claim 15 wherein the computer-readable medium is selected from the group consisting of CD-ROM, floppy disk, flash memory, system memory, hard drive, and data signal embodied in a carrier wave.

17. The computer program product of claim 15 further comprising code that performs equal-cost path splitting.

18. A computer program product for updating a tree structure of a root node in a computer network of interconnected nodes after a change in the network's topology, comprising:

code that receives new route information at the root node;

code that applies an incremental Dijkstra's algorithm to the root node only if the new route information improves or worsens existing routes or the existing routes are lost; and

a computer-readable storage medium for storing the codes.

19. A system for performing route calculations in a link state routing protocol at a node within a computer network, the system comprising a processor operable to evaluate existing routes of the node when new route information is received and recalculate routes for said node only when said new route information improves existing routes or existing routes are made worse or lost; and memory for storing route information.

20. A system for performing route calculations in a link state routing protocol at a node within a computer network, comprising:

means for evaluating existing routes of the node when new route information is received;

means for recalculating routes for said node only when said new route information improves existing routes or existing routes are made worse or lost; and

memory for storing route information.

21. The system of claim 20 further comprising means for performing equal-cost path splitting.